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Wide band instantaneous coverage receiver concept for ALMA

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DOI:
[10.5281/zenodo.3240307](https://doi.org/10.5281/zenodo.3240307)

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2019

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
Adema, J., & Baryshev, A. (2019). *Wide band instantaneous coverage receiver concept for ALMA*.
<https://doi.org/10.5281/zenodo.3240307>

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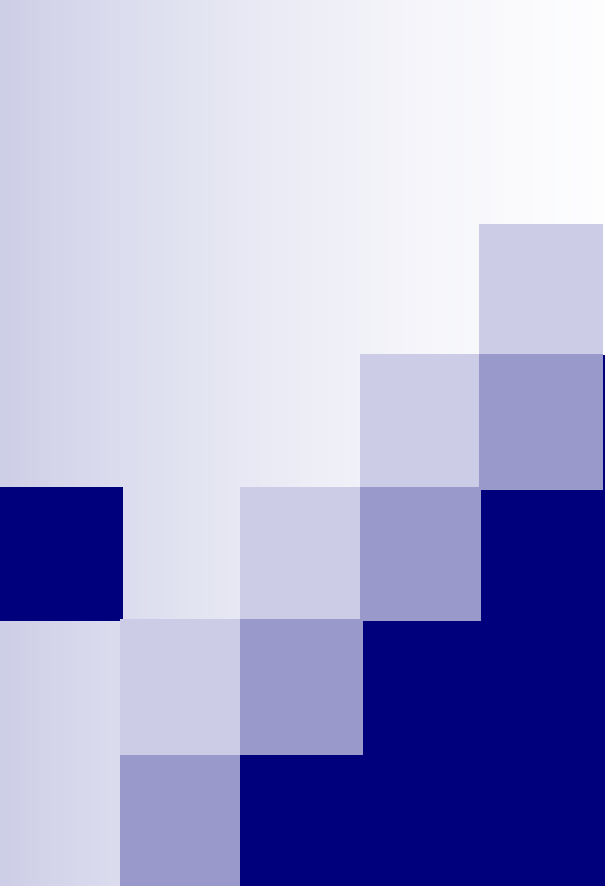
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Wide band instantaneous coverage receiver concept for ALMA

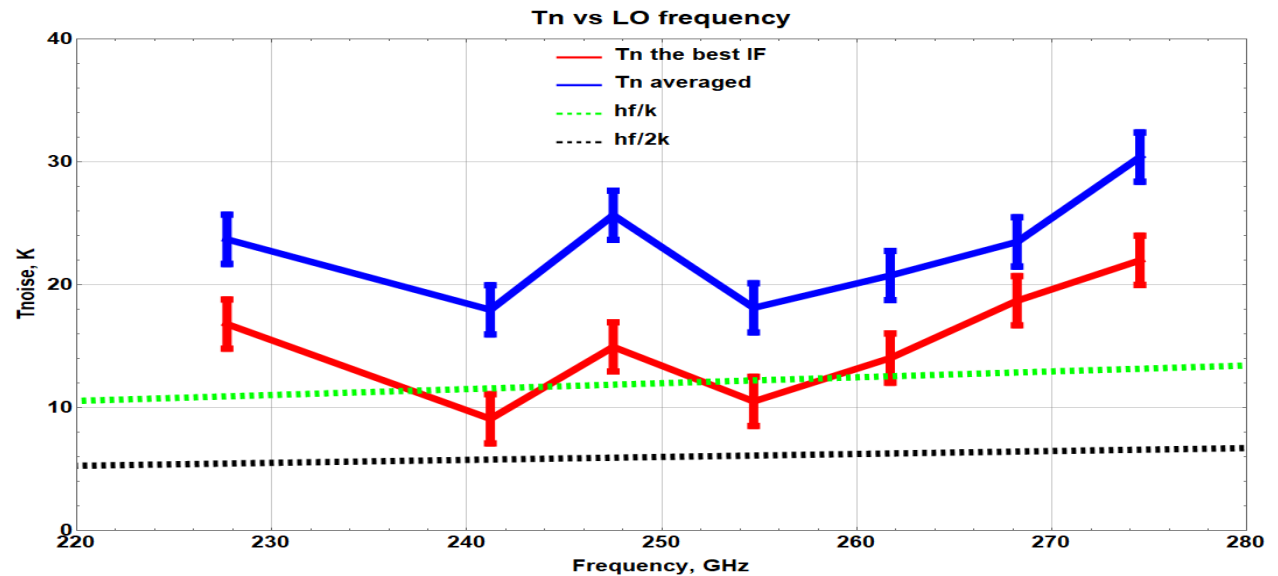
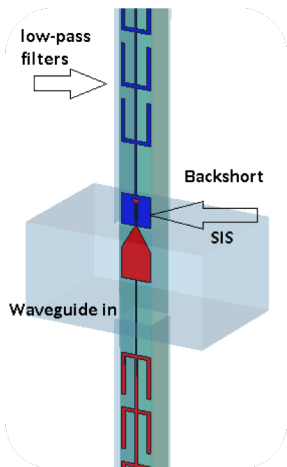
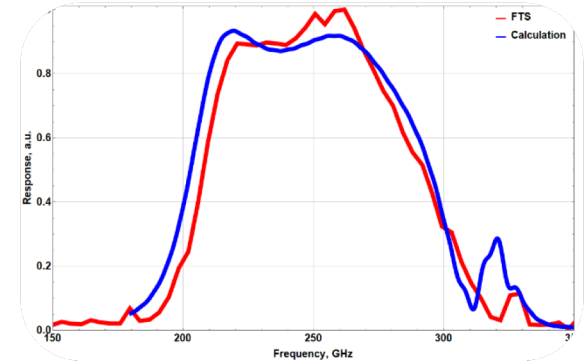
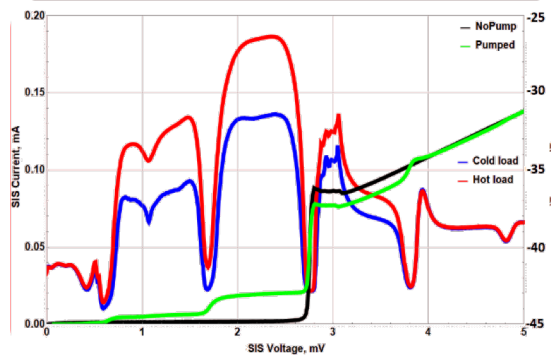
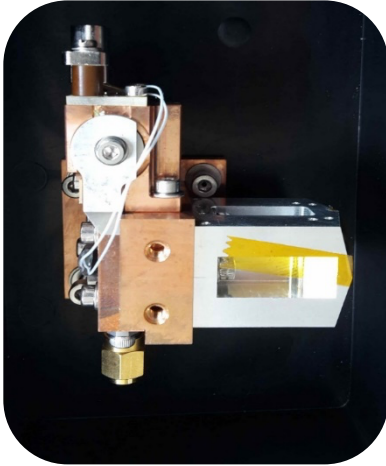
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Improve ALMA!

How can we improve current ALMA system

- Improve sensitivity of SIS mixer (Quantum limited performance @ 260 GHz)
- Improve instantaneous RF bandwidth (dual frequency operation = 1st step)
- Ultra wide instantaneous coverage
= **ultimate receiver** for ALMA

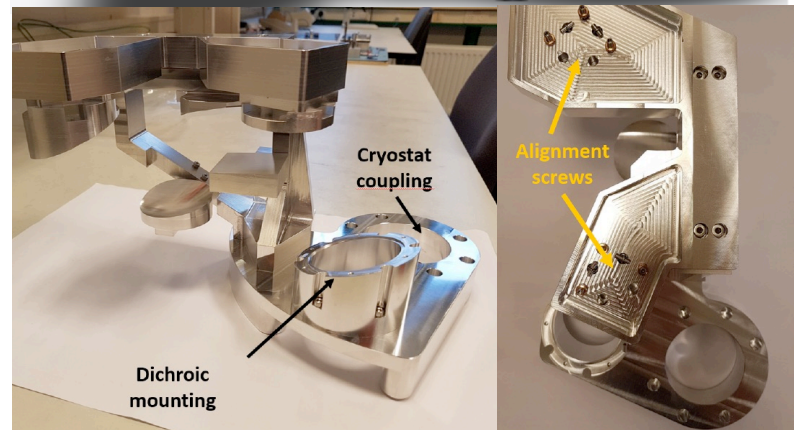
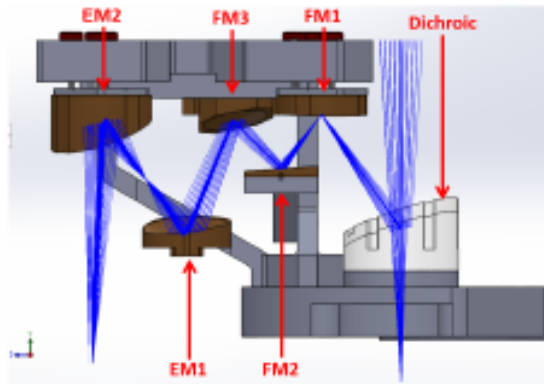
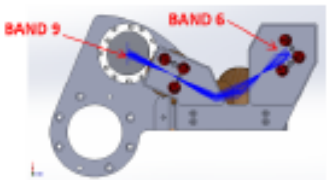
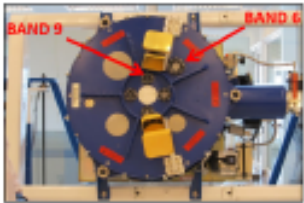
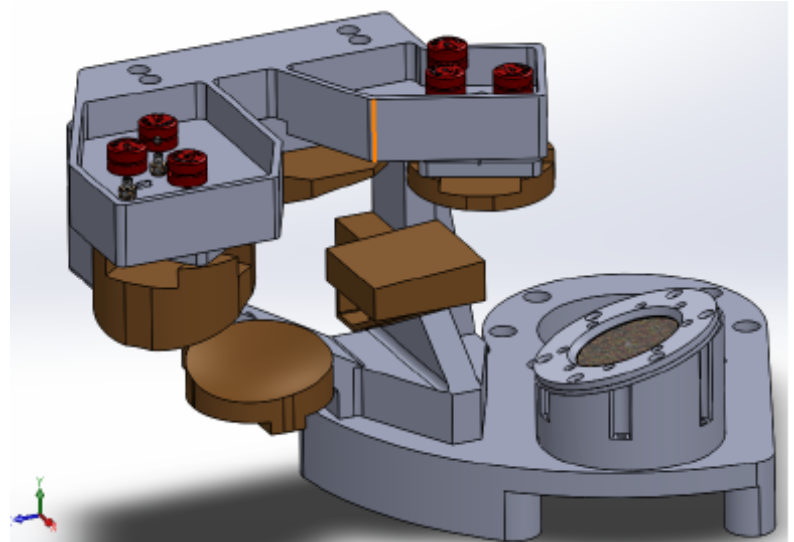
Attacking quantum limit $hf/(2k)$



Dual frequency ALMA B6/9

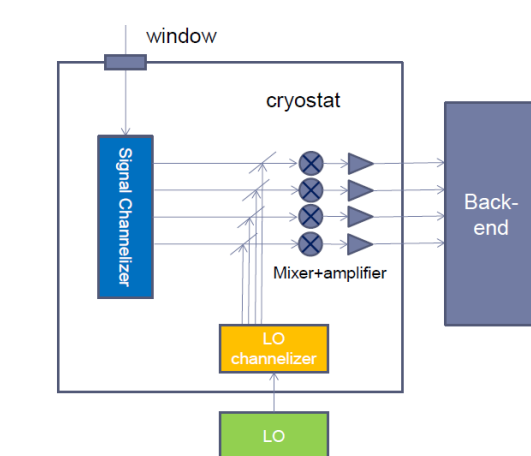
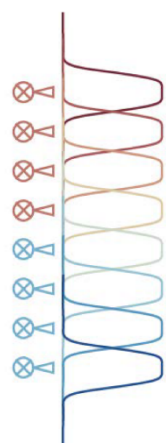
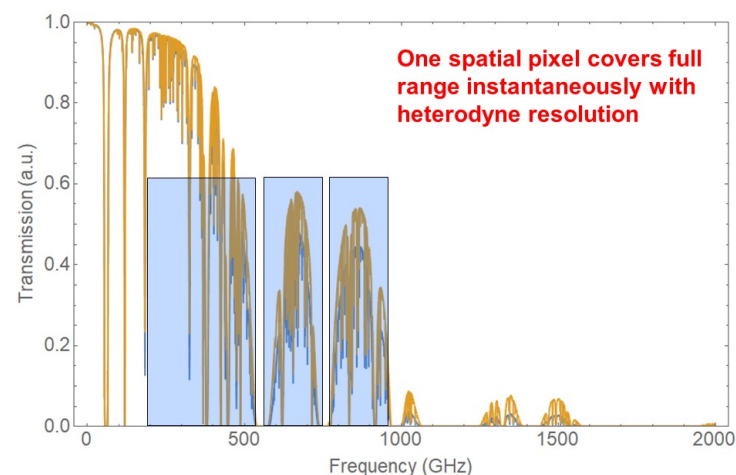
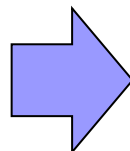
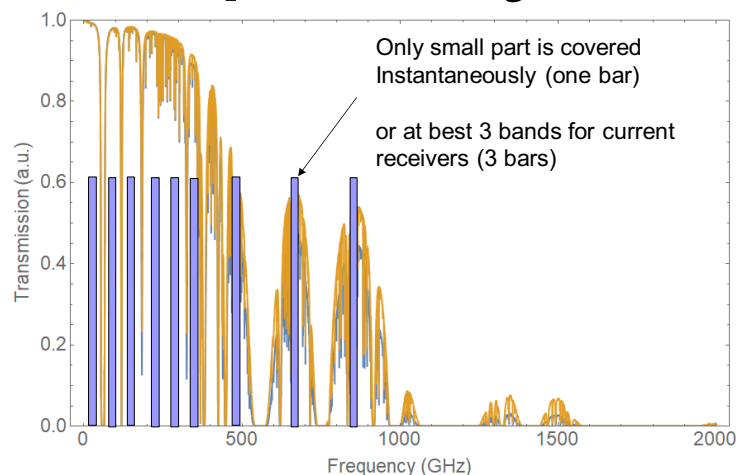
Benefits:

- Improved phase calibration
- Enabling the highest resolution imaging with ALMA
- Observation of transient phenomena
- High redshift resolved cosmic star formation history
- **No changes in ALMA system**

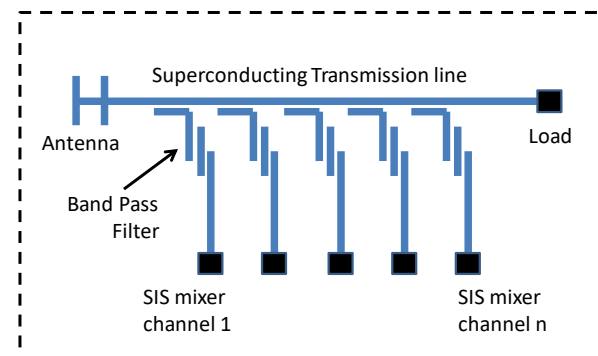


ALMA development workshop

Frequency Array Receiver



Quasi-optical system



An on-chip system

Key advantages

- All atomic/molecular lines are available in one go in high resolution
- Much more information is available for atmospheric transmission correction
- Possibility to study large spectral features (dust)
- Possibility to exclude atmospheric line forest – background limited total power performance
- Blind red shifted CII, CO, CI search (SUPERSPEC, DESHIMA science)
- Ultimate ALMA/ATLAST front-end backend